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Supportive care needs and quality of life in patients with breast and gynecological cancer attending inpatient rehabilitation. A prospective study

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ABSTRACT

Background: Among patients with breast or gynecological cancer, supportive care needs are both highly prevalent and enduring. However, little is known about whether meeting patients' needs is accompanied by increased quality of life (QoL). We aimed to explore patients' supportive care needs reported at the beginning of inpatient rehabilitation and examined whether meeting these needs resulted in improved QoL.

Material and methods: In a multicenter, prospective cohort study with 2 measurement occasions (beginning and end of inpatient rehabilitation), 292 patients with breast and gynecological cancer (mean age 55 years; 71% breast cancer) were enrolled. In 73%, time since diagnosis was longer than 6 months. We obtained self-reports of supportive care needs in 12 domains and measured QoL using the EORTC QLQ-C30 functioning subscales.

Results: At the beginning of inpatient rehabilitation, top-ranking severe supportive care needs concerned coordination of care (48%), medical information (45%), alleviation of physical symptoms (42%) and support with improving health behaviors (36%). At the end of inpatient rehabilitation, all needs assessed declined significantly, although many patients still expressed strong needs in some domains. However, meeting patients' needs was accompanied by improvements in all functioning subscales.

Conclusions: This is the first study to show that meeting breast and gynecological cancer patients' supportive care needs during inpatient rehabilitation resulted in improved QoL. Given the considerable proportions of patients still reporting unmet needs at the end of their stay, stronger and continuing efforts seem warranted to meet these needs and thus further increase QoL.

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Introduction

Cancer patients face many problems that may challenge maintaining quality of life (QoL) and hence constitute supportive care needs [1]. A supportive care need may be defined as the patient's wish for support with a problem, that is, a 'felt need', as opposed to a need as identified by experts [2]. Felt needs and expert-defined needs do not necessarily coincide. For example, only half of cancer patients with elevated levels of distress expressed a wish for psychosocial support [3]. Thus, needs assessment identifies the areas where patients feel to require help [4] and determines the level of assistance they require [5].

Several reviews [6–9] as well as original studies [10–29] have described the prevalence of different supportive care needs in both breast and gynecological cancer. In previous research, the need for additional medical information on the disease has been consistently reported to be highly prevalent in both breast [6,10,16,17,29] and gynecological cancer [7,9,10,12,13,16,24,25,27]. Breast and gynecological patients

also expressed a wish for education on how to improve their health by changing their health behaviors [17,29].

Another highly prevalent need concerns support with emotional and existential problems including fear of cancer recurrence in both breast [6,14–16,26,29] and gynecological cancer [4,7,12,13,16,19,23]. In some patients, the relationship with the partner and sexuality may be affected, constituting a supportive need in breast [18,26,28] and gynecological cancer [7–9,18,21,23]. Moreover, a wish for support regarding communication with other people [26] and contacting others who have experienced cancer [19] were described.

Other prevalent needs pertain to support with the alleviation of physical symptoms and treatment side effects, such as fatigue, lymphedema and pain, as reported in breast [14,22,26,28] and gynecological cancer [9,11,13,23]. Physical functioning in everyday activities may be limited in breast [26,28] and gynecological cancer [12]. Hence, problems with return to work may result, which may require support [26]. If patients are at risk of disability, this may pose legal and financial issues, which may evoke a need for counseling. A

need for assistance with coordination of care was also sometimes described [4,15]. For patients living in rural areas, transportation to aftercare services may be a challenge requiring support [20].

While such needs may be present already during primary treatment, they may well persist beyond its completion. In breast and gynecological cancer, unmet needs enduring for many months after primary treatment have been reported [4,13–15,17,22,29].

A few studies in breast cancer have shown that levels of unmet supportive care needs were linked to lower QoL [30–32]. In cross-sectional studies with breast cancer patients in both China and Japan, a negative correlation was found between the amount of unmet supportive care needs and QoL [30,32]. In a cross-sectional study with breast cancer survivors in Singapore, the amount of unmet supportive care needs mediated the relationship between the level of physical symptoms and both physical and mental QoL [31]. Regarding the particular need of information, a review has shown that high satisfaction with the information received as well as low unmet information needs were related to better QoL [33]. However, most studies were cross-sectional. In a German study, the only prospective study in breast cancer we are aware of, baseline levels of information received, as perceived by patients, predicted QoL three months later, after adjustment for baseline QoL scores [34]. However, prospective studies that evaluate the relationship between meeting patients' needs across a larger array of domains and improved QoL levels are absent.

In Germany, all cancer patients are entitled by law to attend a three-week inpatient rehabilitation program. Although the German Statutory Pension Insurance finances oncological rehabilitation, participation is irrespective of patients' employment status. Participation is voluntary, resulting in a self-selected population of cancer patients attending oncological rehabilitation. In breast cancer, no clear differences between rehabilitation patients and the general breast cancer population emerged regarding sociodemographic and medical characteristics [35,36]. However, QoL seems to be lower in those attending oncological rehabilitation [36].

Oncological rehabilitation programs aim to provide patients with support in managing the long-term challenges associated with their condition. However, the contents and intensity of needs perceived by breast and gynecological patients who attend oncological rehabilitation are unknown. In addition, we do not know to what extent patients' needs are met during inpatient rehabilitation and whether meeting these needs is accompanied by enhanced QoL.

This study had three aims: (1) to identify the contents and scope of supportive care needs in patients with breast and gynecological cancer at the beginning of inpatient oncological rehabilitation; (2) to explore as to what extent these needs are met at the end of inpatient oncological rehabilitation; (3) to examine the association of meeting these needs with improved QoL. We performed a multicenter, prospective cohort study with two measurement occasions (beginning and end of inpatient rehabilitation) enrolling patients with

breast and gynecological cancer in three rehabilitation centers in Germany.

Material and methods

This study complied with the Declaration of Helsinki and was approved by the Ethics Committee of the Medical Faculty of the University of Würzburg, Germany (282/16-mk). All participants provided written informed consent.

Study participants and setting

Patient inclusion criteria comprised the evidence of breast or gynecological (cervical, endometrial, ovarian) cancer, age of 18 years or older and participation in a three-week inpatient rehabilitation program in one of three rehabilitation centers in Germany. The concept of these programs is comprehensive and multiprofessional. Its overarching goal is strengthening patients' self-management competencies by providing them information, skills and support. Interventions available comprise medical treatment, physiotherapy, ergotherapy, exercise therapy, psychoeducation, psychological counseling, relaxation treatment, diet counseling, legal and work-related counseling and counseling on aftercare options. Physicians together with patients decide on which of these interventions to select, according to the individual patient's needs expressed in the admission interview.

Measures

Supportive care needs. Based on the literature review, we selected 12 domains of needs consistently reported to be important. Our aim was to define broad categories considered both relevant and acceptable to patients: (1) alleviation of physical symptoms, (2) enhancement of health behaviors, (3) professional psychosocial support, (4) counseling regarding partnership and sexuality, (5) opportunities to talk to other people, (6) contacting other cancer survivors, (7) medical information, (8) access to a coordinator of treatment and aftercare, (9) legal and financial counseling, (10) managing household and everyday activities, (11) return to work and (12) transportation to aftercare examinations. Regarding each item, we asked patients how strong their need of support or counseling was, using a 4-point Likert scale. Response options were (1) 'no need', (2) 'low need', (3) 'medium need' and (4) 'strong need'. In addition to assessing the strengths of needs in individual domains, we also computed a sum-score indication the overall strength of needs across domains (Cronbach's alpha = 0.81).

Quality of life. Patients' QoL was assessed using the self-reported 30-item European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) [37]. This instrument is widely used and has excellent reliability and validity. It comprises five functioning subscales, i.e., physical, role, emotional, cognitive and social functioning. Items are rated using a 4-point Likert scale ranging from 1 (not at all) to 4 (very much). Subscale scores

are transformed such that they may range from 0 to 100, with higher scores indicating better functioning.

Sociodemographic characteristics were assessed by patients' self-reports. We obtained clinical characteristics from patients' charts.

Statistical analysis

We present descriptive statistics for supportive care needs. We analyzed changes between start and end of inpatient rehabilitation using Wilcoxon signed-rank tests or paired *t*-tests, as appropriate. For each of the five EORTC QLQ-C30 functioning subscales, we conducted a multiple hierarchical linear regression analysis. In this analysis, the functioning subscale served as the dependent variable. As predictors, we included both the baseline score and the follow-up score of the supportive care needs sum-scale. In doing so, we created a residual score of the supportive care needs sum-scale, which represents the change in the level of supportive care needs. In all analyses, we adjusted for the baseline value of the functioning subscale, thus accounting for change in functioning. Together, we examined whether change in supportive care needs predicted change in functioning during the inpatient rehabilitation period. A two-sided $p < 0.05$ was considered significant. IBM SPSS 23.0 (Armonk, NY, USA) software was used.

Results

Sample characteristics

A total of 386 patients were eligible to participate, and 338 consented to do so (response rate 88%). However, 10 did not provide data at the beginning of inpatient rehabilitation (T1), leaving 328 patients. Of these, 292 (89%) also provided data at the end of inpatient rehabilitation (T2). Thus, 292 patients (76% of all eligible patients) who provided data at both measurement occasions comprised the final sample.

The mean age of participants was 55 years ($SD = 8.6$; range 27 to 81; Table 1). Sixty percent were married, and 70% were cohabiting. More than 70% had received more than basic school education. About 70% were employed, either full-time or part-time. Seventy-one percent suffered from breast cancer, and 29% from gynecological cancer (13% ovarian cancer, 8% endometrial cancer, 8% cervical cancer). In 90%, this was a primary cancer. In 73%, time since diagnosis was longer than 6 months.

Supportive care needs

At the beginning of rehabilitation (T1), the proportions of patients rating their respective need to be strong were as follows (Table 2): Between 40% and 50% of patients felt strong needs regarding access to a coordinator of treatment and aftercare, medical information and alleviation of physical symptoms, respectively. One-third strongly wished support with the enhancement of health behaviors. About one-fourth expressed a strong need for support regarding return to

Table 1. Sociodemographic and clinical characteristics ($n = 292$).

Age (years), mean (SD)	55	(8.6)
Marital status ^a , <i>n</i> (%)		
Never married	44	(15.1)
Married	175	(60.1)
Divorced	49	(16.8)
Widowed	23	(7.9)
Living with a partner ^b , <i>n</i> (%)	204	(71.6)
Education ^c , <i>n</i> (%)		
Less than junior (< 10 y; basic secondary school)	79	(27.3)
Junior (10 y; middle-level secondary school)	142	(49.1)
Senior (high-school graduate)	64	(22.1)
Other	4	(1.34)
Employment status ^a , <i>n</i> (%)		
Fulltime	105	(36.1)
Half-day	70	(24.1)
Less than half-day	26	(9.0)
Unemployed	14	(4.8)
Disability pension	9	(3.1)
Old-age pension	42	(14.4)
Other	25	(8.6)
Cancer site, <i>n</i> (%)		
Breast cancer	207	(70.9)
Ovarian cancer	39	(13.4)
Endometrial cancer	24	(8.2)
Cervical cancer	22	(7.5)
Stage of cancer ^b , <i>n</i> (%)		
Primary cancer	256	(89.8)
Recurrent cancer	18	(6.3)
Metastatic cancer	11	(3.9)
Primary treatment, <i>n</i> (%)		
Operation	283	(96.9)
Radiotherapy	209	(71.6)
Chemotherapy	168	(57.5)
Time since diagnosis ^d , <i>n</i> (%)		
Less than 6 months	79	(27.2)
Between 6 months and 1 year	112	(38.6)
More than 1 year up to 2 years	56	(19.3)
More than 2 years up to 5 years	29	(10.0)
More than 5 years	14	(4.8)

^amissing: $n = 1$; ^bmissing: $n = 7$; ^cmissing: $n = 3$; ^dmissing: $n = 2$.

work, legal and financial counseling as well as professional psychosocial support and one-fifth regarding contact to a cancer survivor or opportunities to talk to someone, respectively. Patients only rarely endorsed strong needs for support with transportation, partnership and sexual counseling or help with managing household and everyday activities. At the end of rehabilitation (T2), all needs assessed declined significantly and substantially, although considerable proportions of patients still expressed strong needs in some domains (Table 2). The sum-score of unmet needs reduced significantly between the beginning and the end of inpatient rehabilitation (beginning: $M = 2.56$, $SD = 0.57$; end: $M = 2.22$, $SD = 0.65$; $p < .001$).

Correlates of supportive needs

Age showed a weak, negative correlation with the degree of supportive care needs (sum-scale) at T1 ($r = -.16$, $p = .007$), but not T2 ($r = .05$, $p = .39$). At T1, no significant difference existed between patients with basic education and those with more than basic education ($M = 2.54$, $SD = 0.60$ vs. $M = 2.57$, $SD = 0.56$, $p = .66$). At T2, however, needs were stronger in those with basic education compared to those

Table 2. Supportive care needs at beginning and end of inpatient rehabilitation.

Domain	Beginning of rehabilitation				End of rehabilitation				<i>p</i> -value
	M	Med	SD	Strong need ^a , %	M	Med	SD	Strong need ^a , %	
1. Access to a coordinator of treatment and aftercare	3.16	3	0.97	47.6	2.86	3	1.12	38.3	<.001
2. Medical information	3.24	3	0.83	44.9	2.85	3	1.01	31.0	<.001
3. Alleviation of physical symptoms	3.13	3	0.89	41.9	2.70	3	0.99	24.8	<.001
4. Enhancement of health behaviors (e.g., smoking, diet and physical activity)	2.93	3	1.00	35.8	2.43	2	1.07	19.9	<.001
5. Return to work	2.43	3	1.23	27.2	1.97	2	1.09	13.6	<.001
6. Legal and financial counseling	2.60	3	1.09	27.0	2.34	2	1.10	20.9	<.001
7. Professional psychosocial support	2.68	3	1.03	25.8	2.30	2	1.06	17.1	<.001
8. Contacting other cancer survivors	2.66	3	0.92	18.7	2.33	2	1.01	14.5	<.001
9. Opportunities to talk to other people	2.63	3	0.94	18.7	2.26	2	1.01	12.8	<.001
10. Transportation to aftercare examinations	1.60	1	0.99	9.6	1.44	1	0.87	5.6	.002
11. Counseling regarding partnership and sexuality	2.01	2	0.98	8.7	1.73	1	0.89	4.6	<.001
12. Help with household and everyday activities	1.70	1	0.94	6.6	1.52	1	0.84	4.8	<.001

^aProportion of patients who rated their need of support or counseling to be 'strong' on a 4-point Likert scale. Ranking based on the proportion of patients reporting a strong need at baseline. *p*-values from Wilcoxon signed-rank tests based on a 4-point response scale. Med = Median.

Table 3. Quality of life (EORTC QLQ-C30 functioning subscales) at beginning and end of inpatient rehabilitation.

	Beginning of rehabilitation		End of rehabilitation		<i>p</i> -value
	M	SD	M	SD	
Physical functioning	73.2	18.7	78.8	18.7	<.001
Role functioning	50.1	28.7	64.4	29.2	<.001
Emotional functioning	46.9	26.3	64.2	27.9	<.001
Cognitive functioning	56.4	29.9	65.1	27.5	<.001
Social functioning	54.1	28.8	63.7	29.1	<.001

Scores may range from 0 to 100. Higher values indicate better functioning.

with more than basic education ($M = 2.40$, $SD = 0.69$ vs. $M = 2.16$, $SD = 0.62$, $p = .004$). At both measurement occasions, no significant differences emerged between those living with a partner and those without ($p = .53$). Likewise, no significant differences emerged between patients with breast cancer and those with gynecological cancer ($p = .39$).

Supportive care needs by employment status

As our sample was heterogeneous regarding employment status and time since diagnosis, we examined associations of these characteristics with the prevalence of supportive care needs.

Employed patients showed a higher overall level of supportive care needs at T1 compared to non-employed patients ($M = 2.62$, $SD = 0.56$ vs. $M = 2.44$, $SD = 0.56$; $p = .013$). At T2, this difference disappeared. Regarding needs domains, a strong need for support with alleviation of physical symptoms (45.6% vs. 33.0%, $p = .045$) and return to work (30.8% vs. 18.2%, $p = .035$) was perceived more frequently in employed patients compared to their non-employed counterparts at T1. Both differences disappeared at T2.

Supportive care needs and time since diagnosis

We compared patients with a time since diagnosis of more than 1 year with those with a shorter time since diagnosis. Both groups did not differ significantly in the overall level of supportive care needs at both T1 and T2. However, regarding needs domains, patients with a longer time since diagnosis

more frequently perceived a strong need for support with contacting other cancer survivors (25.5% vs. 15.3%, $p = .037$) and help with household and everyday activities (11.2% vs. 4.2%, $p = .024$) at T1. At T2, strong needs were more prevalent in those with longer time since diagnosis regarding alleviation of physical symptoms (32.3% vs. 21.2%, $p = .038$), albeit with greatly reduced prevalence compared to T1, opportunities to talk to other people (19.2% vs. 9.5%, $p = .02$) and counseling regarding partnership and sexuality (10.4% vs. 1.6%, $p = .001$).

Relationship between meeting supportive care needs and quality of life

Table 3 shows the course of the EORTC QLQ-C30 functioning subscales from the beginning to the end of inpatient rehabilitation. In all subscales, significant improvements were evident. In all EORTC QLQ-C30 subscales, reduction in supportive care needs was accompanied by improvements in functioning (Table 4).

Discussion

This is the first study, to our knowledge, examining the course of breast and gynecological cancer patients' supportive care needs during inpatient rehabilitation in Germany. At the beginning of inpatient rehabilitation, top-ranking strong supportive care needs concerned coordination of care, medical information, alleviation of physical symptoms and support with improving health behaviors. At the end of inpatient rehabilitation, all needs assessed declined significantly, although many patients still reported strong needs in some domains. However, meeting patients' needs was accompanied by improvements in all functioning subscales of the EORTC QLQ-C30.

Unexpectedly, access to an aftercare coordinator was ranking top of all needs reported. This may indicate that many patients find it difficult navigating through the German health-care system, which decomposes into different sectors responsible for providing healthcare at different stages of cancer treatment (that is, acute care mostly in inpatient departments, inpatient rehabilitation in dedicated

Table 4. Predicting EORTC QLQ-C30 functioning subscales at end of inpatient rehabilitation by change in supportive care needs (multiple linear regression analyses).

Predictor	Physical functioning (corrected R ² = .68)		Role functioning (corrected R ² = .34)		Emotional functioning (corrected R ² = .47)		Cognitive functioning (corrected R ² = .48)		Social functioning (corrected R ² = .35)	
	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value
Change in supportive care needs sum-score	-.17	<.001	-.18	.003	-.22	<.001	-.17	.001	-.27	<.001
Baseline supportive care needs sum-score	.10	.02	.05	.38	.13	.015	.08	.12	.09	.12
Baseline functioning subscale score	.80	<.001	.54	<.001	.65	<.001	.67	<.001	.51	<.001

rehabilitation clinics and aftercare in private practices or outpatient departments). However, in a study from Denmark, concerns about doctors talking to each other to coordinate care ranked top of unmet needs (42.6%) in a sample of breast cancer patients assessed between 3 months and 5 years after diagnosis, which seems to mirror our results [15]. Likewise, in a qualitative study from Denmark, women with metastatic breast cancer voiced a need for coordinated multidisciplinary care including psychological support, physiotherapy and social counseling [38].

A need for additional medical information ranked second at the beginning of inpatient rehabilitation. Previous research consistently reported that this need is most prevalent in patients with both breast [6,10,16,17,29] and gynecological cancer [7,9,10,12,13,16,24,25,27]. Third-ranking was a need for support with the alleviation of physical symptoms. The importance of this need has also been noted by previous studies in breast [14,22,26,28] and gynecological cancer [9,11,13,23]. Counseling on improving health behavior also ranked high among patients' needs at the beginning of inpatient rehabilitation. While this need was only rarely mentioned in previous research [17,29], it may have gained importance in recent years since changing one's health behaviors, such as physical activity and diet, to improve one's health has been strongly advocated by both public media and medicine in the last years.

A considerable proportion of patients reported supportive needs regarding return to work and legal and financial counseling, which has been rarely described in previous research [26]. This result may reflect the constitution of our sample, with about 70% of participants being employed. A need for professional psychosocial support, with a strong need present in one fourth, was not as pronounced as expected based on previous research in both breast [6,14–16,26,29] and gynecological cancer [4,7,12,13,16,19,23]. In recent years, certification agencies in Germany have requested oncological hospitals to provide psycho-oncological care to patients which may have increased utilization during acute care, thus reducing needs during rehabilitation [39]. About one-fifth reported a strong need for contacting other cancer patients and opportunities to talk to other people. While these needs may in part be addressed during inpatient rehabilitation, they may better be fulfilled in everyday living after discharge. Last, needs regarding transportation to aftercare examinations, counseling regarding partnership and sexuality and help with household and everyday activities seemed to play a minor role.

At the beginning of inpatient rehabilitation, older patients reported less needs than younger patients did, as has been described in previous research [6,15], but this effect was weak and vanished at the end of the inpatient stay, which may indicate that older patients' excess needs were met by the rehabilitation services. By contrast, patients with basic education reported stronger needs at the end of rehabilitation as compared to those with more than basic education. This may indicate that patients with higher education levels may benefit more from the interventions offered [17].

At the beginning of inpatient rehabilitation, employed patients, as compared to non-employed patients, reported stronger needs overall and regarding alleviation of physical symptoms and return to work. As physical symptoms may hinder patients' return to work, this seems plausible. Of note, these differences were no longer evident at the end of inpatient rehabilitation.

Patients with a time since diagnoses of more than 1 year did not differ from those with a shorter time in the overall level of needs. Higher proportions with a strong need for help in household and everyday activities, talking to other people and contact to other cancer survivors in patients with a longer time since diagnosis may mirror their higher age, lower functioning and less social integration [4,13]. The emerging stronger needs for alleviation of physical symptoms as well as partnership and sexuality counseling suggest that long-term sequelae of cancer and its treatment may be more difficult to reduce than acute symptoms present in the aftermath of primary treatment [14,22].

From the beginning to the end of inpatient rehabilitation, all supportive care needs assessed declined significantly. This finding suggests that needs were met to a greater degree at the end, as compared to the beginning, of inpatient rehabilitation. However, the picture presented seems ambivalent. On the one hand, we observed a considerable reduction in the strengths of patients' needs. On the other, substantial proportions of rehabilitants expressed persisting needs even at the end of their inpatient stay.

Although all EORTC QLQ-C30 functional subscales improved significantly during inpatient rehabilitation, subscale means were still well below German population norms at the end of rehabilitation [40]. They also were lower, with few exceptions, than those reported for breast cancer patients in Austria both 3-to-6 months and 1 year, respectively, after initial treatment [41] or in Sweden four months post-diagnosis [42]. This finding may represent the effect of a selection bias, as distressed patients may be more likely to choose attending inpatient rehabilitation [36].

While some previous studies found unmet supportive care needs to be linked to lower QoL [30–32], this is the first study to show that meeting such needs relates to improved QoL. Although this finding might show that interventions addressing patients' needs were effective, which resulted in improved QoL, we cannot prove this assumption as this was an observational study. Still, other models of impact are possible. Conversely, one might conceive of a model suggesting that an intervention increasing QoL would in turn reduce unmet needs. Last, unspecific factors associated with inpatient rehabilitation, such as time off work or everyday life and spending time with other patients, may have affected both supportive care needs and QoL. Together, exploring causal impact would require an experimental study.

What are the clinical implications of our findings? The finding of persisting needs at the end of inpatient rehabilitation necessitates improving inpatient rehabilitation processes, such as systematically assessing patients' needs and assigning to those in need tailored interventions addressing the needs expressed. In addition, our results suggest making continuing efforts of survivorship care after discharge to meet these needs. Based on previous research, various interventions are at hand that might be helpful. Providing patients with a survivorship care plan detailing the available resources might help alleviating the need for coordination of care, although evidence is insufficient at this point [43]. By contrast, patient navigator programs have proven effective in improving access to aftercare services [44]. To satisfy patients' need for information, tailoring information provision might be helpful [45]. Question prompts, that is, lists of personally relevant questions for use during consultations with physicians have demonstrated to be beneficial [46]. Providing patients with access to programs fostering health behavior change in everyday life, such as increasing physical activity and healthy diet, would be suitable [47], while taking barriers to participation, such as health concerns and time pressures, into account [48]. From the patients' perspective, physicians' recommendations have a major role in motivating patients to participate in such programs [49]. Digital and telephone-based health behavior interventions also seem promising [50,51]. In addition, to increase the uptake of professional psychological care in those who need it, reducing barriers to utilization by appropriate information and implementation of screening tools seems promising [3,52]. Last, low-threshold access to expert-care as part of a survivorship program may help with symptom management [53]. In addition, digital interventions facilitating self-care in cancer patients are also available [54].

Several limitations to this study should be acknowledged. A major limitation is the lack of a control group, which precludes assigning the changes assessed to the rehabilitation program. Second, although our sample was large enough to have the power to detect relevant changes in the outcome variables assessed in the whole sample, the proportion of women with gynecological cancer was rather small. Thus, our finding of no significant difference of the strength of supportive care needs between breast and gynecological

cancer patients should be taken cautiously. To date, few studies have compared both entities regarding patients' supportive needs, with mixed results [16,55,56].

Another limitation concerns the items used for assessing supportive care needs, which were designed specifically for this study, with no prior evaluation of their psychometric properties. However, this appears to be common practice in this research field [26,29,34,56–58]. Indeed, the questions used were straightforward, face-valid and easy to interpret. Although the needs domains selected may not cover all relevant issues, we feel, however, confident of having included a major portion of needs domains most relevant to cancer patients attending inpatient rehabilitation. Further limitations concern the short period investigated as well as the lack of generalizability to other cancer populations, male cancer patients and rehabilitation settings outside Germany. Our sample seems representative regarding age and education for the German breast and gynecological cancer population, though [16,17,28,34,35].

The strengths of the study include its prospective design, with two measurement occasions at the beginning and the end of inpatient rehabilitation, and its considerable sample size. Moreover, the dropout rate at the follow-up measurement occasion was rather low, reducing possible bias by selective dropout.

Conclusions

To conclude, we found highly prevalent supportive care needs in patients suffering from breast and gynecological cancer at the beginning of inpatient rehabilitation. Needs were particularly marked regarding coordination of treatment and aftercare, medical information, alleviation of physical symptoms and support with modification of health behaviors. Although all needs declined at the end of inpatient rehabilitation, substantial proportions of patients still reported unmet needs. Meeting patients' needs was associated with increased QoL across all functioning domains assessed. Thus, efforts to meet patients' needs seem to bear the potential of increasing patients' QoL.

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Disclosure statement

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